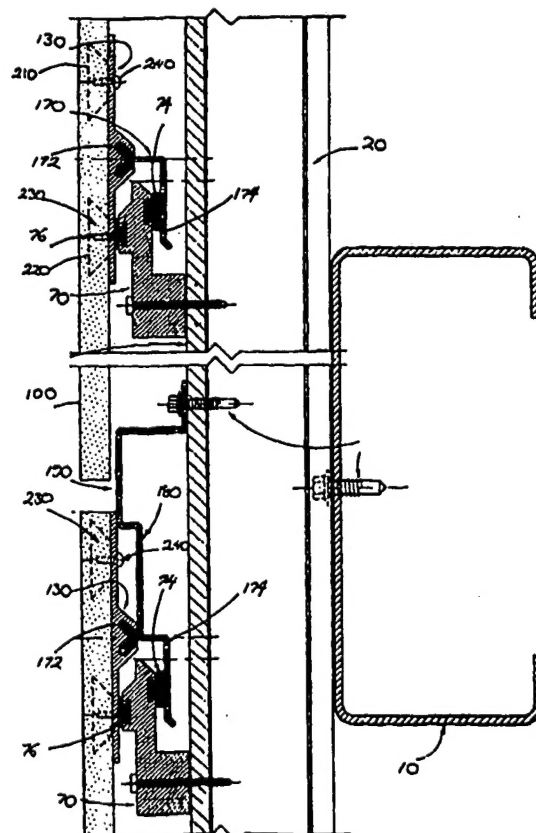


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification⁶ : E04B 1/61, 2/88, 2/96, E04F 13/08, 13/14, E04C 2/38	A1	(11) International Publication Number: WO 98/10151 (43) International Publication Date: 12 March 1998 (12.03.98)
(21) International Application Number: PCT/AU97/00582 (22) International Filing Date: 5 September 1997 (05.09.97) (30) Priority Data: PO 2159 5 September 1996 (05.09.96) AU (71) Applicant (for all designated States except US): JAMES HARDIE RESEARCH PTY. LIMITED [AU/AU]; 65 York Street, Sydney, NSW 2000 (AU). (72) Inventors; and (75) Inventors/Applicants (for US only): BADO, John, Joseph [AU/AU]; 558 Smithfield Road, Greenfield Park, NSW 2176 (AU). COTTIER, John, Sidney [AU/AU]; 84 Moons Avenue, Lugarno, NSW 2210 (AU). ZARB, Joseph, Emmanuel [AU/AU]; Lot 203 Cartwright Street, Bonnyrigg, NSW 2177 (AU). (74) Agent: SHELSTON WATERS; 60 Margaret Street, Sydney, NSW 2000 (AU).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>

(54) Title: AN IMPROVED CLADDING BOARD MOUNTING SYSTEM**(57) Abstract**

An improved cladding board mounting system for mounting cladding boards (100) adjacent a surface to be concealed. Each cladding board (100) includes at least one support member (130) on the interior face (120) of the cladding board. The system further includes at least one mounting member (170) which includes an engaging formation (172) adapted for releasable engagement with a complementary engaging formation (132) of a respective support member. The mounting member also includes a second segment (174) for releasable connection to the surface to be concealed. Preferably a mounting bracket (70) extends between the surface to be clad and the mounting member (170).



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

- 1 -

TITLE: AN IMPROVED CLADDING BOARD MOUNTING SYSTEM

TECHNICAL FIELD

The present invention relates to a cladding board mounting system and particularly but not only cladding systems using fibre cement cladding boards.

5 BACKGROUND ART

The invention has been developed primarily for use in mounting cladding boards to the external walls of buildings. However, it will be appreciated that the invention is not limited to this particular use and, for example, is equally suited to mounting cladding boards to the internal walls or surfaces of buildings or other like structures.

10 Hitherto, known cladding board mounting systems have relied upon embedded fasteners, front fixing fasteners or adhesives to mount cladding boards to walls. Each of these systems has disadvantages.

For example, embedded fasteners such as captive nuts or wire hooks are difficult and costly to produce and are inflexible in their application. Also, complicated engaging and
15 mating assemblies are required to be attached to the surface on which the board is mounted.

Front fixing fasteners generally comprise screws inserted through the cladding board and into wooden or metal battens previously attached to the building. The major disadvantage of this system is that the exposed surface of the cladding board must be re-finished in order to hide the screw heads and give a uniform and attractive external appearance. This re-finishing
20 is both time consuming and costly, especially where the cladding boards are mounted to multi-story buildings, as it must be performed in-situ. Moreover, several types of cladding board have outer decorative surfaces which cannot be easily or economically re-finished, if at all.

Adhesive cladding board systems avoid the re-finishing problems described above but are expensive to install due to the specialised adhesives required. Moreover, the adhesives have been prone to failure over time and falling cladding boards constitute a significant safety hazard.

5 The present applicant has attempted to overcome some of these difficulties by providing a new cladding board mounting system which is subject of International patent application No. PCT/AU96/00828.

This system has been at least partially success in overcoming some of the difficulties of the prior art, however, it is also highlighted certain problems.

10 In the cladding board system subject of the abovementioned International patent application, V-shaped grooves are formed in the cladding board to receive complimentary shaped mounting strips. These mounting strips are releasably held in the grooves and protrude from the rear surface of the board for connection to the wall to be clad. These strips, however, make the board difficult to stack and can be damaged or cause damage to the board during storage or transport. Further, the grooves formed in the board for receiving the
15 mounting strips can weaken the board and lead to damage as the board flexes in use or during transportation and installation.

 Further, the various grooves in the cladding board must align with each other precisely. As will be apparent to those skilled in the art, quite apart from aesthetic
20 considerations, uneven loading or positioning of the cladding board can lead to various structural difficulties.

It is an object of the present invention to ameliorate one or more of these deficiencies of the prior art or at least provide a commercial alternative to the prior art cladding systems.

DISCLOSURE OF THE INVENTION

In a first aspect, the present invention provides a cladding board mounting system for mounting cladding boards adjacent to a surface to be concealed, said system comprising:

at least one support member adapted to be attached to an interior mounting face of
5 said cladding board, and

at least one mounting member including a first segment having an engaging formation adapted for releasable engagement with a complementary engaging formation in a respective one of said support member(s), and a second segment adapted for releasable connection to the surface to be concealed.

10 Preferably each support member is in the form of substantially 2-dimensional support layer adapted to be attached to the interior mounting face of the cladding board.

The support layer may cover substantially the entire interior mounting face of the cladding board or alternatively, a number of support layers or strips may be attached to the interior mounting face of the cladding board. Preferably the support member extends
15 substantially across the entire width of the cladding board. By providing the complementary engaging formations in a support member attached to the cladding board rather than in the cladding board itself the opportunity for damage to both the board and mounting members is not only reduced but the support member actually reinforces the cladding board by reducing flexure.

20 The support member(s) may be formed from the same material as the cladding board or other materials such as plastic, steel etc, but aluminium is particularly preferred and may be glued or mechanically fastened or both to the interior mounting face of the cladding board. The mounting member may similarly be constructed of aluminium, plastic, steel etc.

- 4 -

In another embodiment, the first segment of the mounting member comprises a V cross-sectional channel adapted to slidably engage a pair of mutually divergent recesses formed in the respective support member.

5 In another embodiment, the second segment of each mounting member comprises a downwardly extending portion configured to facilitate releasable connection of the mounting member to the surface to be concealed. Preferably at least one mounting member includes an additional extended portion for permanent attachment to the surface to be concealed.

In still a further embodiment, the cladding board mounting system includes a plurality of mounting brackets adapted to be attached to the surface to be concealed, each
10 mounting bracket providing a recess for releasable engagement with the mounting member. A resilient mounting means may be provided between the cladding board and the surface to be concealed. This resilient means is preferably configured to permit limited relative movement between the cladding board and surface to be concealed. Most preferably the resilient mounting means comprises a rigid mounting bracket adapted to be attached to the surface to
15 be concealed with an exterior resilient portion adapted to abut the support member or cladding board and an interior resilient portion adapted to abut the second segment of the mounting member.

In another embodiment, these resilient portions are offset in the direction of load of the cladding board on the brackets and configured to thereby hold the cladding board in
20 position by action of the load following movement of the cladding board in a plane parallel to the surface to be concealed.

The support members may be attached to the cladding board by any appropriate mechanism. In a preferred embodiment, however, the support member is attached to the

- 5 -

cladding board by a plurality of discrete fastening means positioned across the width of the cladding board and partially embedded in the cladding board.

In a second aspect, the present invention provides a cladding board mounting system for mounting cladding boards adjacent the surface to be concealed, said system comprising:

5 a plurality of reinforcement members adapted to be attached to the cladding board, and

a plurality of resilient mounting means adapted to mount the cladding board on the surface to be concealed wherein

said resilient mounting means are configured to allow limited movement of the
10 cladding board relative to the surface to be concealed.

In the second aspect it is preferred that a mounting member extend from respective reinforcement members for releasable engagement with the resilient mounting means. In one embodiment, the resilient mounting means comprises a rigid mounting bracket adapted to be attached to the surface to be concealed with an exterior resilient portion adapted to abut the
15 reinforcement member or cladding board and an interior resilient portion adapted to abut the mounting member. Most preferably the exterior and interior resilient portions are offset in the direction of load of the cladding board on the brackets and configured to thereby hold the cladding board in position by action of the load following movement of the cladding board in a plane parallel to the surface to be concealed.

20 The cladding board is preferably constructed of fibre reinforced cement.

BRIEF DESCRIPTION OF THE DRAWINGS

- 6 -

So that the nature of the present invention may be more clearly understood, preferred embodiments will now be described, by way of example only, with reference to the accompanying drawings in which:

Figures 1, 2 and 3 are perspective views of various stages of construction of the cladding board mounting system according to an embodiment of the present invention;

Figure 4 is a front elevational view of a moisture resistant barrier which forms part of the cladding board mounting system shown in figures 1-3;

Figure 5 is perspective view of a cladding board for use with the inventive cladding board mounting system according to another embodiment of the present invention;

Figure 6 is an end elevational view of the cladding mounting system according to a further embodiment of the present invention;

Figure 7 is a perspective view of an arrangement for mounting support members on the cladding board in accordance with still a further embodiment of the present invention;

Figure 8 is a perspective view of a mounting bracket for use with the inventive cladding board mounting system according to still a further embodiment of the present invention.

BEST MODE(S) FOR CARRYING OUT THE INVENTION

Figure 1 is a perspective view of the first stage of the cladding system. The cladding system starts with a support framework over the wall to be concealed. This framework includes a plurality of horizontally arranged steel channels or girts 10. On an exterior side of these girts 10 a plurality of mutually parallel vertically arranged channel members or "top hats" 20 are arranged.

- 7 -

Turning now to figure 2, the next stage is the optional attachment of a moisture resistant barrier 30 to top hats 20. In the embodiment shown, this moisture resistant barrier 30 is provided by a plurality of fibre cement sheets 40 fastened to top hats 20 however other moisture resistant barriers such as building paper or sarking etc can be used. The joints
5 between these fibre reinforced cement sheets 40 may be sealed by appropriate horizontal flashing 50 and/or vertical flashing/jointing 60.

The next step in the inventive cladding board construction is the positioning and attachments of mounting means to the framework to support the cladding boards. A plurality of mounting brackets 70 is attached to this fibre reinforced cement sheet 40 as shown in
10 figures 3 and 4.

A perspective view of the preferred construction of the mounting brackets can be seen in figure 8. The mounting bracket 70 preferably comprises a rigid bracket portion 72 with an interior resilient portion 74 and an exterior resilient portion 76. In the drawing, resilient portions 74, 76 are provided by rubber or other unitary elastomeric material. Other
15 resilient means such as leaf or coil springs or spring clips may also be used. The rigid bracket portion 72 has aperture(s) 78 therethrough for passage of a screw, nail or other fastening means for attaching the mounting bracket to the framework.

As seen more clearly in figure 3, each mounting bracket 70 is fastened through the fibre reinforced cement sheet 40 to a top hat 20. The number and configuration of the
20 mounting brackets 70 will depend on a number of factors including the size and weight of the cladding board to be supported thereon. To ensure correct alignment of the various mounting brackets 70 a template may be used. This template is laid over the fibre reinforced cement sheet 40 and marked with appropriate positions for the mounting brackets 70.

- 8 -

In the embodiment shown in figures 3 and 4 there are three mounting brackets on each level of the sheet 40. If desired, one can provide for more mounting brackets at the top, for particularly large cladding boards 100, and less at the bottom since the lower mounting brackets are essentially for wind loading only. The mounting brackets 70 at the lower end of each cladding board serve little function in the way of vertically supporting the cladding board. For example if the cladding board 100 was particularly large or wider an operator may determine that 5 or 6 mounting brackets were required at the top with a lower number eg 2 or 3 at the lower end.

The inventive cladding board is shown in figure 5. The cladding board comprises board portion 100 having an exterior face 110 and interior face 120. Attached to the interior face 120 of the cladding board 100 is the support member 130.

The support member(s) includes an engaging formation 132. This engaging formation 132 is preferably provided by a pair of neutrally divergent recesses which, as will be discussed below, are configured to mate with an engaging formation in a mounting member.

It should be noted that as shown in the drawings, the engaging formation 132 is not formed or cut directly in the cladding board but instead is formed or cut in one or more support members 130 attached to the interior mounting face of the cladding board 100.

In this embodiment the support member 130 is provided by a number of substantially parallel mutually spaced apart strips.

As will be understood by persons skilled in the art, cutting or forming the engaging formation 132 directly in the board may affect the structural integrity of the board. In particular, when such cladding boards 100 are handled they tend to flex and any recesses or

channels in the board itself may concentrate the stress applied to the cladding board along the line of the channel. This may lead to weakening or cracks appearing in the cladding board in the area of the channels or recesses.

By providing one or more support members 130 on an interior mounting face of the
5 cladding board 100, the structural integrity of the cladding board 100 is maintained and in fact reinforced. This arrangement reduces flexing of the cladding board 100 during handling. Even in the event of cracks appearing in the support members 130, these cracks do not propagate into the cladding board due to the laminated structure of the support member(s)/cladding board.

10 As mentioned above, the support member(s) may be formed from the same material as the cladding board or, alternatively, any other suitable material such as plastic, steel etc, however, aluminium is preferred.

These support members 130 may be fastened to the interior face 120 of the cladding board 100 by any appropriate mechanism such as gluing, mechanical fastening etc. One
15 particularly preferred mechanism for attaching the support members 130 to the cladding board 100 is shown in figure 7.

As shown in figures 6 and 7 a series of blind or undercut keyhole slots 200 are formed in the interior face of the cladding board 100. These slots 200 have mutually opposed undercut portions 210 and 220 adapted to receive the small threaded disks or captive nuts 230.
20 These threaded nuts or disks are adapted to engage with threaded fasteners 240. As shown more clearly in figure 6 these threaded fasteners 240 pass through support members 130 to engage the disk or nut 230 embedded in the cladding board and thereby hold the support member 130 flush against the interior face 120 of the cladding board 100. This mechanical

- 10 -

attachment of the support members 130 to the cladding board may be assisted with glue.

Preferably the fastening of the support members 130 to cladding board 100 is accomplished off-site and the cladding boards 100 are transported with the support members 130 in place.

As mentioned above, the support members 130 act to reinforce the cladding board to
5 reduce flexure and damage during transportation and installation. They are also extremely useful for hanging the cladding board during painting.

Once on site, mounting members or splines 170 are slidably inserted into the support members 130 as shown in figure 5. The mounting members 170 include a first segment having an engaging formation 172 adapted to mate with the complementary engaging
10 formation 132 in the support member 130. In the embodiment shown the engaging formation of the mounting member is a V cross-sectional channel 172 configured to engage the pair of mutually divergent recesses 132 formed in the support member 130. The second segment of the mounting member 170 is a downwardly directed extension 174 to releasably engage the mounting brackets 70. The support members 130 and/or mounting members 170 preferably
15 extend substantially across the entire width of the cladding board. Once the mounting members 170 are in position in the support members 130, the ends of the support members 130 may be crimped or sealed to prevent the mounting members 170 from sliding out.

To mount the cladding board 100 it is simply lowered onto the various mounting brackets 70 as shown more clearly in figure 6. In one embodiment, packing material may be
20 provided on the top edge of an already mounted cladding board, so that the cladding board to be mounted is lifted onto the mounting brackets 70 directly above and lowered to contact the packing material. This ensures the cladding board to be mounted is parallel with the cladding board directly below. As shown in figure 6 the resilient portions 74, 76 which are deformable,

- 11 -

are arranged to abut the support member 130 or cladding board 100 on an exterior side and the mounting member 170 on an interior side. The mounting bracket 70 and resilient gripping means 74, 76 are arranged to hold and support the cladding board but allow limited movement of the cladding board 100 relative to the surface to be concealed. Preferably there is no contact between the mounting bracket 70 and the support member 130 or mounting member 170 other than through resilient portions 74, 76. This allows the cladding board to "float" on the mounting brackets since there is no abutment of the rigid bracket portion 72 on the mounting member 170 or support member 130.

The preferred arrangement for the resilient portion 74 and 76 shown in figure 6 is to offset these portions in the direction of load of the cladding board 100 on the brackets 70. This configuration allows the cladding board to move in a direction parallel to the surface to be concealed. By action of the load of the cladding board on the resilient portion 74, 76 the cladding board is held in its new position.

Such an arrangement has several advantages. Firstly, it allows the position of the cladding board 100 to be altered slightly to make up for any minor misalignment of the cladding board system. Further, the resilient portions 74, 76 act as a shock absorber for the cladding board. To explain, on the exterior of the building, the cladding boards 100 may be exposed to high wind, rain and other natural forces. The cladding boards 100 will move in response to these natural forces. If the cladding board 100 is rigidly attached to the mounting brackets 70, any flexure of the cladding board may cause damage. With the present inventive resilient portions 74, 76 between the mounting brackets 70 and cladding board 100, vibratory movement of the cladding board toward and away from the surface to be concealed or movement in the plane of the board is dampened somewhat by these resilient portions 74, 76

- 12 -

thereby reducing the possibility of damage to the cladding board. As mentioned above, the support strips 130 and mounting members 170 which extend across the entire width of the cladding board, also reduce flexure of the cladding board in situ.

The arrangement also allows the board 100 to move in situ, to a limited extent and
5 relative to the surface to be concealed, on the mounting brackets 70 to relieve any internal stresses acting on the board.

In a preferred embodiment, the uppermost mounting member 170 of each cladding board comprises an additional upstanding portion 180. This upstanding portion 180 is adapted to be attached to the top hats 20 through fibre cement sheet 40. This upstanding
10 portion 180 serves several purposes. Firstly, it is used to provide additional support for the cladding board and correctly position and fix the cladding board 100 to the top hats 20. It also provides a horizontal flashing portion 190 to substantially seal the gap between vertically adjacent cladding boards, as shown in figure 6.

Once the cladding board is approximately in place, vertical and horizontal flashing
15 may be positioned between the just mounted cladding board and the surrounding boards. This flashing reduces water ingress behind the cladding board and helps to stop vermin entering the space between the fibre cement water resistant layer 30 and the cladding boards 100. Since it is possible to adjust the position of the cladding board 100 prior to fixing the upstanding mounting portion 180, it is possible to mechanically seal or flash the various joints between
20 the cladding boards. Conventional cladding systems use sealants or gaskets which tend to degrade or fail after a few years when exposed to the elements. With the inventive cladding board system, however, since the cladding board may be moved on the mounting bracket 70 until fixed via upstanding mounting portion 180, it is possible to manipulate the position of

- 13 -

the board so that it abuts the mechanical flashing thereby providing a long lasting vermin and moisture resistant barrier which will not degrade to anywhere near the extent of conventional sealants or gaskets.

As shown more clearly in figure 3, it is also preferred that the cladding boards 100
5 are mounted offset relative to the fibre cement water resistant sheets 40. By offsetting the joins of the cladding boards 100 with the sheets 40, it is more difficult for water to pass between both the cladding boards 100 and fibre cement sheets 40 toward the steel girts 10 and top hats 20.

In the embodiment shown, the support members 130 and mounting members 170
10 extend substantially horizontally. Equally these support members and mounting members may be positioned vertically or diagonally to support cladding boards 100.

Also in the embodiments shown both the support member 130 and mounting member 170 extend substantially across the entire width of the cladding board 100. As an alternative the cladding board 100 may include a plurality of support members extending only part way
15 across the cladding board or even individual support members each positioned to releasably engage a matching number of mounting brackets 70 via a respective mounting members 170.

As a further embodiment, the mounting member 170 may be provided to extend substantially across the entire width of the cladding board 100 and engage a plurality of substantially colinear support members spaced across the cladding board.

20 Either prior to or after the cladding boards are mounted they may painted or covered with any particular finish desired. Preferably the cladding boards are constructed from fibre reinforced cement (frc). The frc cladding boards allow for a greater range of finishes than do conventional wooden or metal cladding sheets.

- 14 -

Although the invention has been described with reference to specific examples, it will be appreciated by those skilled in the art that the invention may be embodied in many other forms.

- 15 -

CLAIMS

1. A cladding board mounting system for mounting cladding boards adjacent to a surface to be concealed, said system comprising:
 - at least one support member adapted to be attached to an interior mounting
 - 5 face of said cladding board, and
 - at least one mounting member including a first segment having an engaging formation adapted for releasable engagement with a complimentary engaging formation in a respective one of said support member(s), and a second segment of the mounting member being adapted for releasable connection to the surface to be
 - 10 concealed.
2. A cladding board mounting system as claimed in claim 1 wherein each support member is formed by a substantially two-dimensional support layer adapted to be attached to the interior mounting face of the cladding board.
3. A cladding board mounting system as claimed in claim 1 or 2 wherein the
- 15 support layer substantially covers the entire interior mounting face of the cladding board.
4. A cladding board mounting system as claimed in claim 1 or 2 wherein each support member comprises a strip extending substantially across the entire width of the cladding board.
- 20 5. A cladding board mounting system as claimed in any one of the previous claims wherein the first segment of the mounting member comprises a V cross-sectional channel adapted to slidably engage a pair of mutually divergent recesses formed in the respective support member.

- 16 -

6. A cladding board mounting system as claimed in any one of the previous claims wherein the second segment of each mounting member comprises a downwardly extending portion configured to facilitate releasable connection of the mounting member to the surface to be concealed.
- 5 7. A cladding board mounting system as claimed in claim 6 wherein at least one of the mounting members includes an additional extended portion for permanent attachment to the surface to be concealed.
8. A cladding board mounting system as claimed in any one of the previous claims further including a plurality of mounting brackets adapted to be attached to the
10 surface to be concealed, each mounting bracket providing a recess for releasable engagement with the mounting member.
9. A cladding board mounting system as claimed in any one of the previous claims wherein a resilient mounting means is provided between the cladding board and the surface to be concealed.
- 15 10. A cladding board mounting system as claimed in claim 10 wherein the resilient mounting means is adapted to permit limited relative movement between the cladding board and the surface to be concealed.
11. A cladding board mounting system as claimed in claim 9 or 10 wherein the resilient mounting means comprises a rigid mounting bracket adapted to be attached to
20 the surface to be concealed with an exterior resilient portion adapted to abut the support member or cladding board, and an interior resilient portion adapted to abut the second segment of the mounting member.

- 17 -

12. A cladding board mounting system as claimed in claim 11 wherein said interior and exterior resilient portions are offset in the direction of load of the cladding board on the brackets and configured to thereby hold the cladding board in position by action of the load following movement of the cladding board in a plane parallel to the surface to be concealed.

13. A cladding board mounting system as claimed in any one of the previous claims wherein each support member is attached to the cladding board by a plurality of discrete fastening means positioned across the width of the cladding board and partially embedded in the cladding board.

10 14. A cladding board mounting system as claimed in any one of the preceding claims wherein the cladding board is constructed from fibre reinforced cement.

15. A cladding board mounting system as claimed in any one of the preceding claims wherein each support member and mounting member extends, in use, generally horizontally relative to the surface to be clad.

15 16. A cladding board mounting system for mounting cladding boards adjacent to a surface to be concealed, said system comprising:

a plurality of reinforcement members adapted to be attached to the cladding board, and

a plurality of resilient mounting means adapted to mount the cladding board on the surface to be concealed, wherein

said resilient mounting means are configured to allow limited movement of the cladding board relative to the surface to be concealed.

- 18 -

17. A cladding board mounting system as claimed in claim 16 wherein a mounting member extends between and releasably engages respective reinforcement members and resilient mounting means.

18. A cladding board mounting system as claimed in claim 17 wherein the
5 resilient mounting means comprises a rigid mounting bracket adapted to be attached to the surface to be concealed with an exterior resilient portion adapted to abut the reinforcement member or cladding board and an interior resilient portion adapted to abut the mounting member.

19. A cladding board mounting system as claimed in claim 18 wherein the
10 interior and exterior resilient portions are offset in the direction of load of the cladding board on the bracket and configured to thereby hold the cladding board in position by action of the load following movement of the cladding board in plane parallel to the surface to be concealed.

20. A cladding board mounting system as claimed in any one of claims 16 to 19
15 wherein the cladding board is constructed from fibre reinforced cement.

21. A cladding board mounting system as claimed in any one of claims 16 to 20 wherein each support member and mounting member extends, in use, generally horizontally relative to the surface to be clad.

1/8

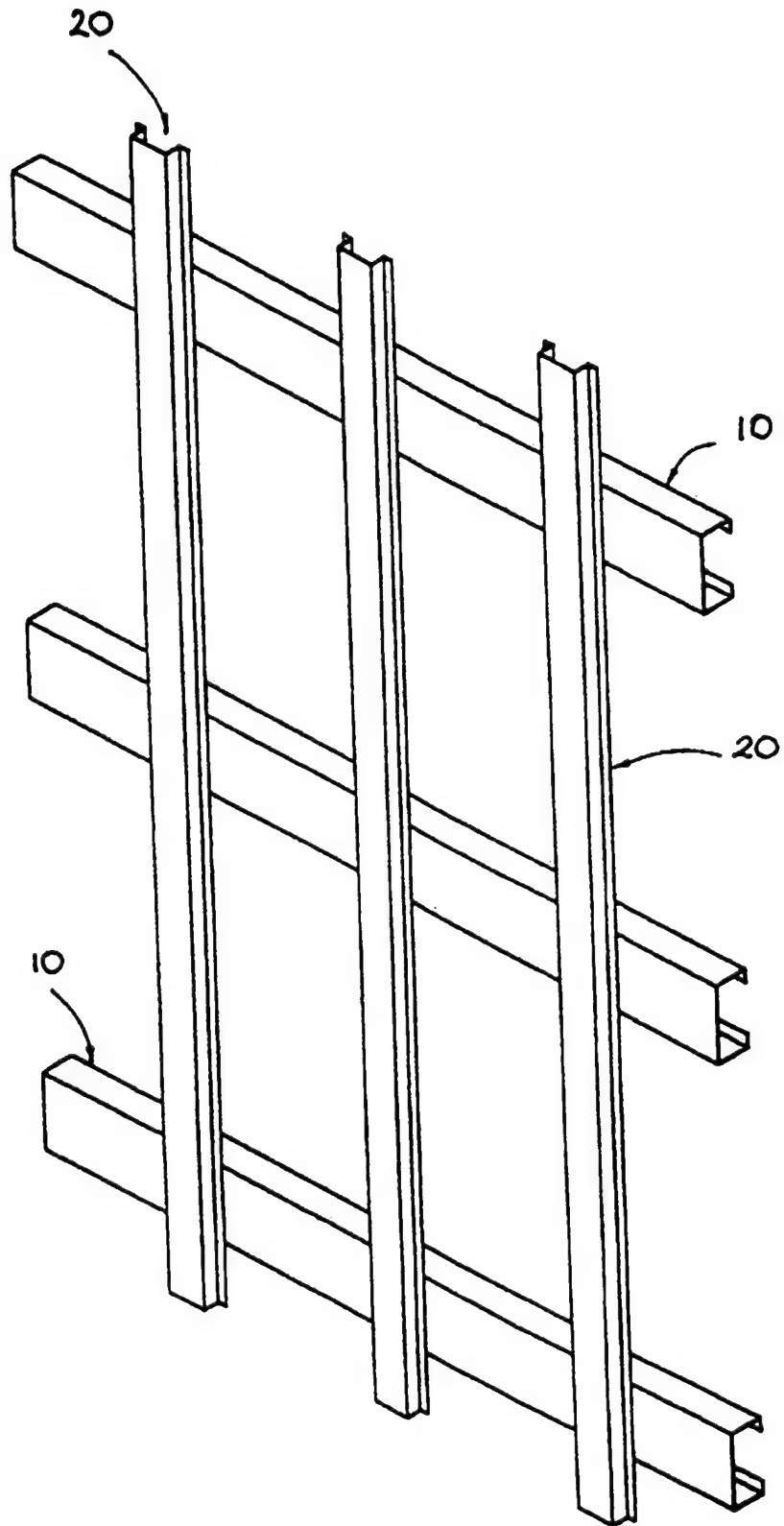


FIG. 1

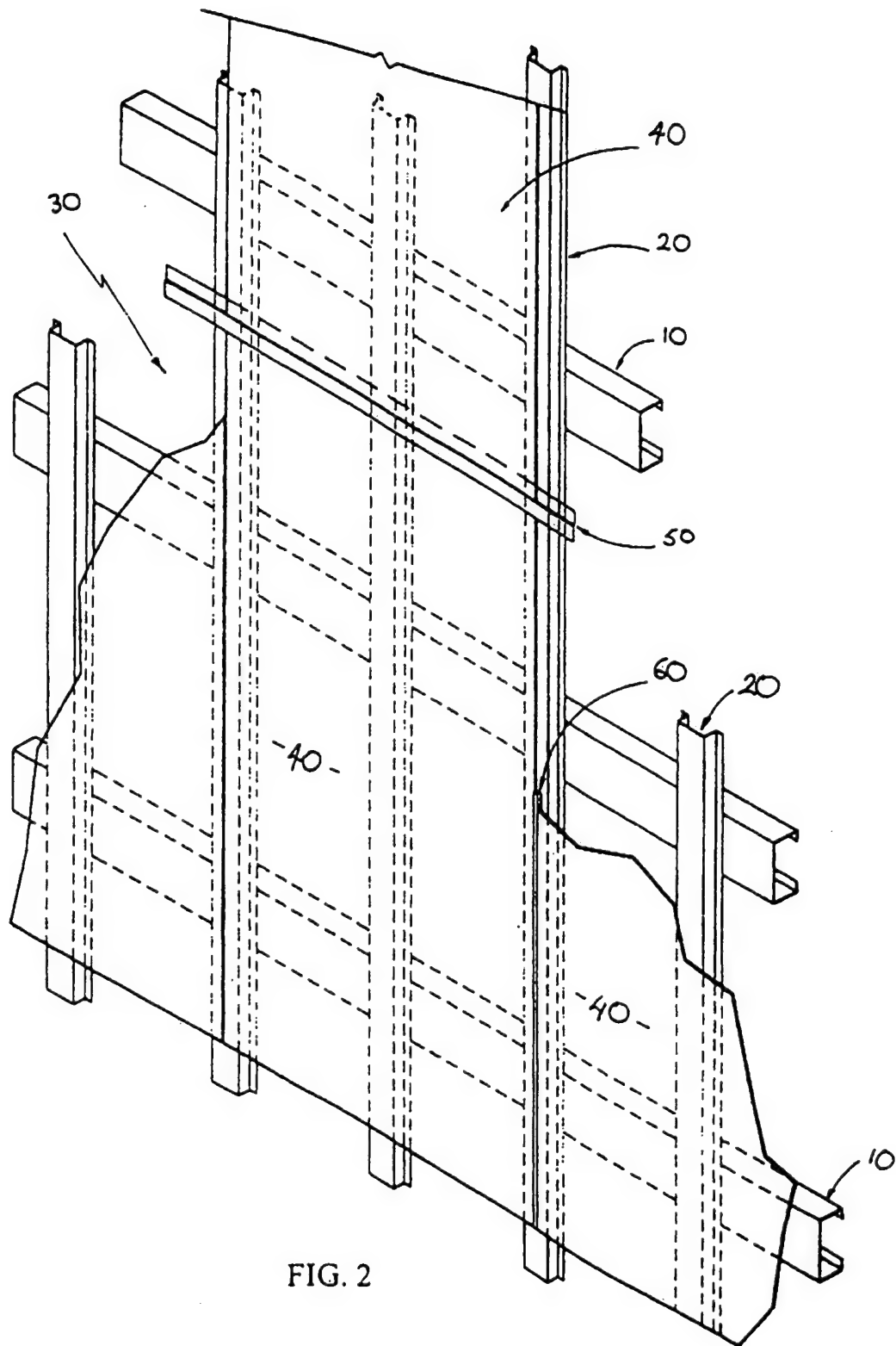


FIG. 2

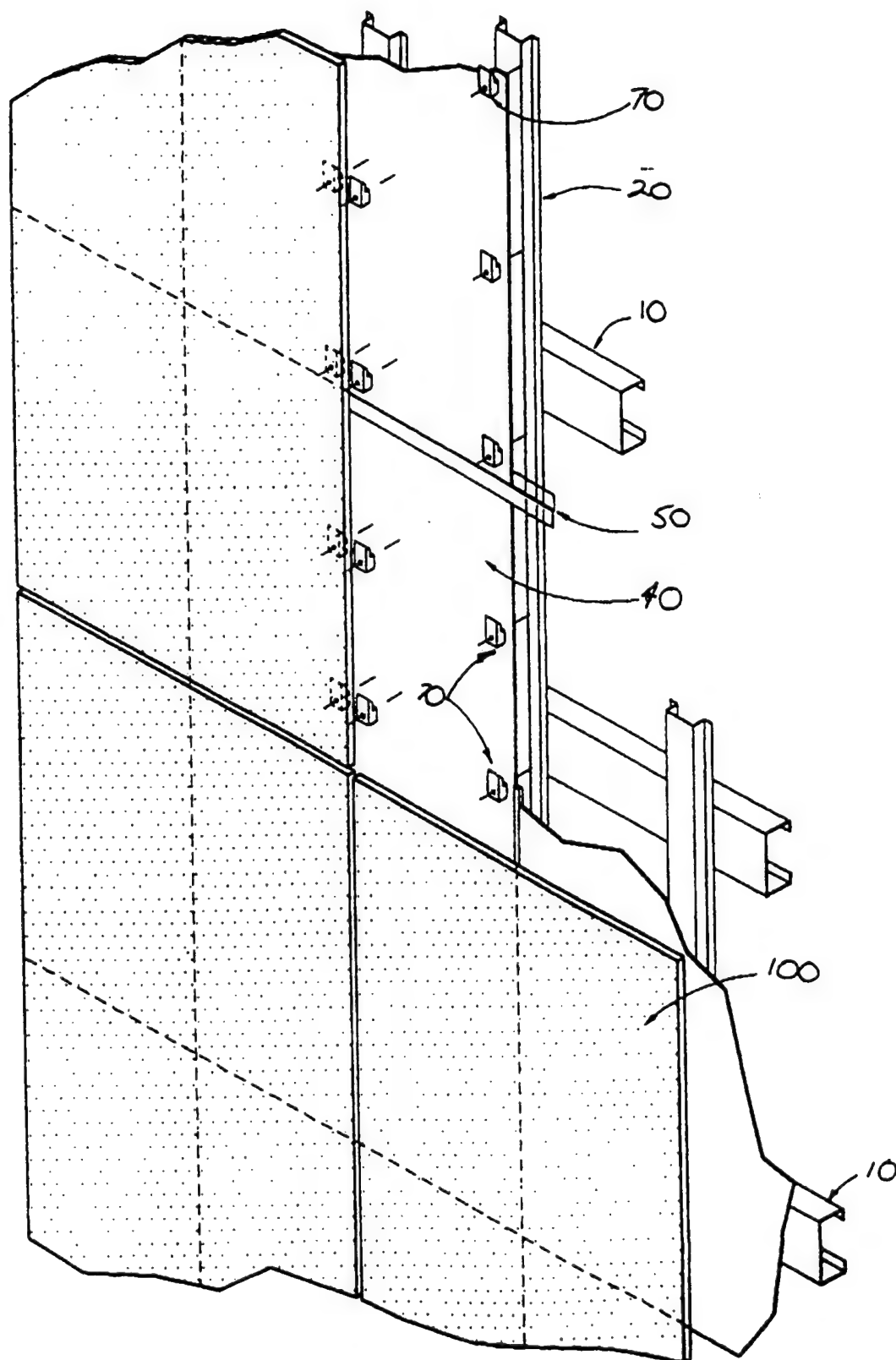


FIG. 3

4/8

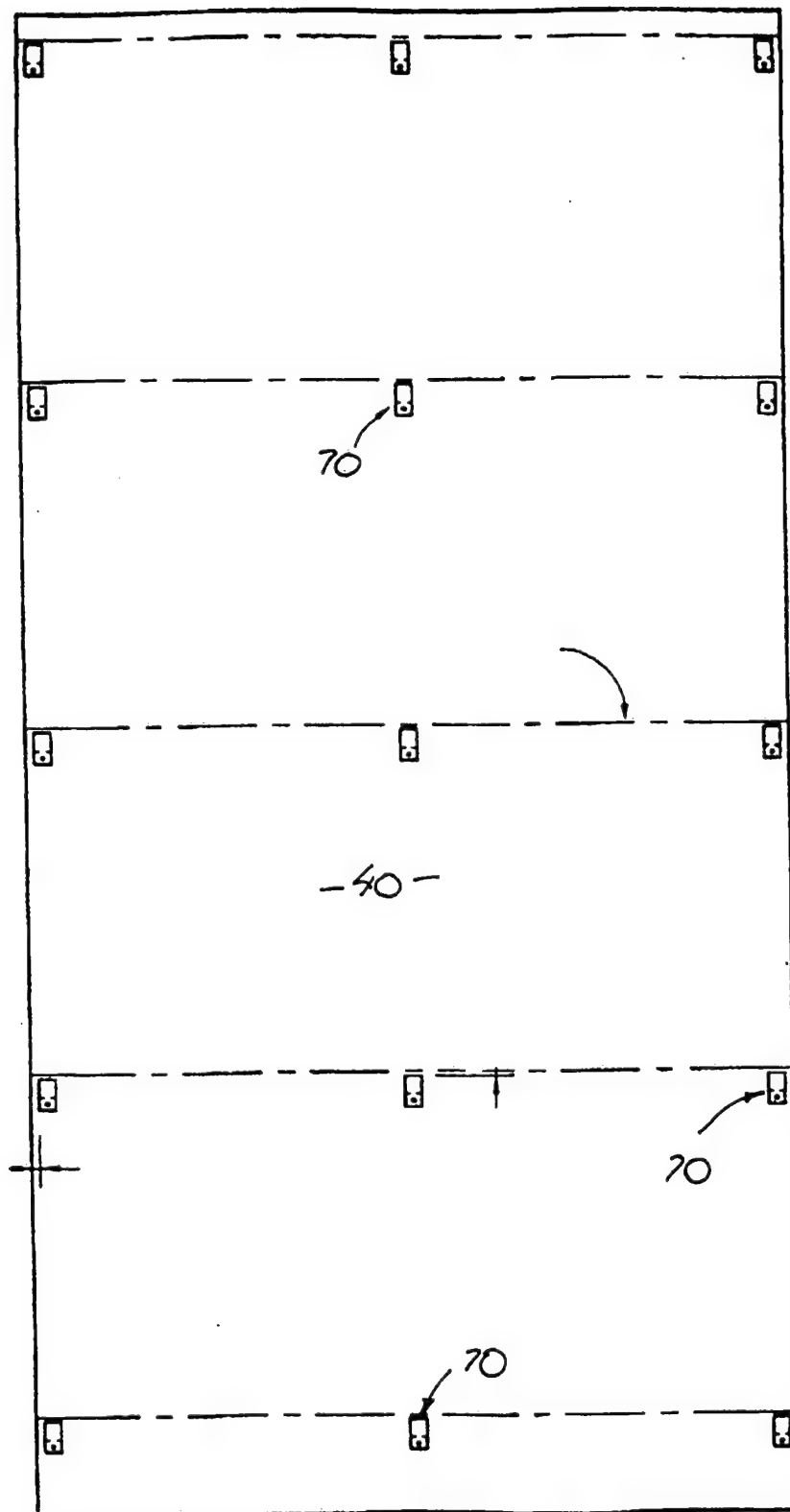


FIG. 4

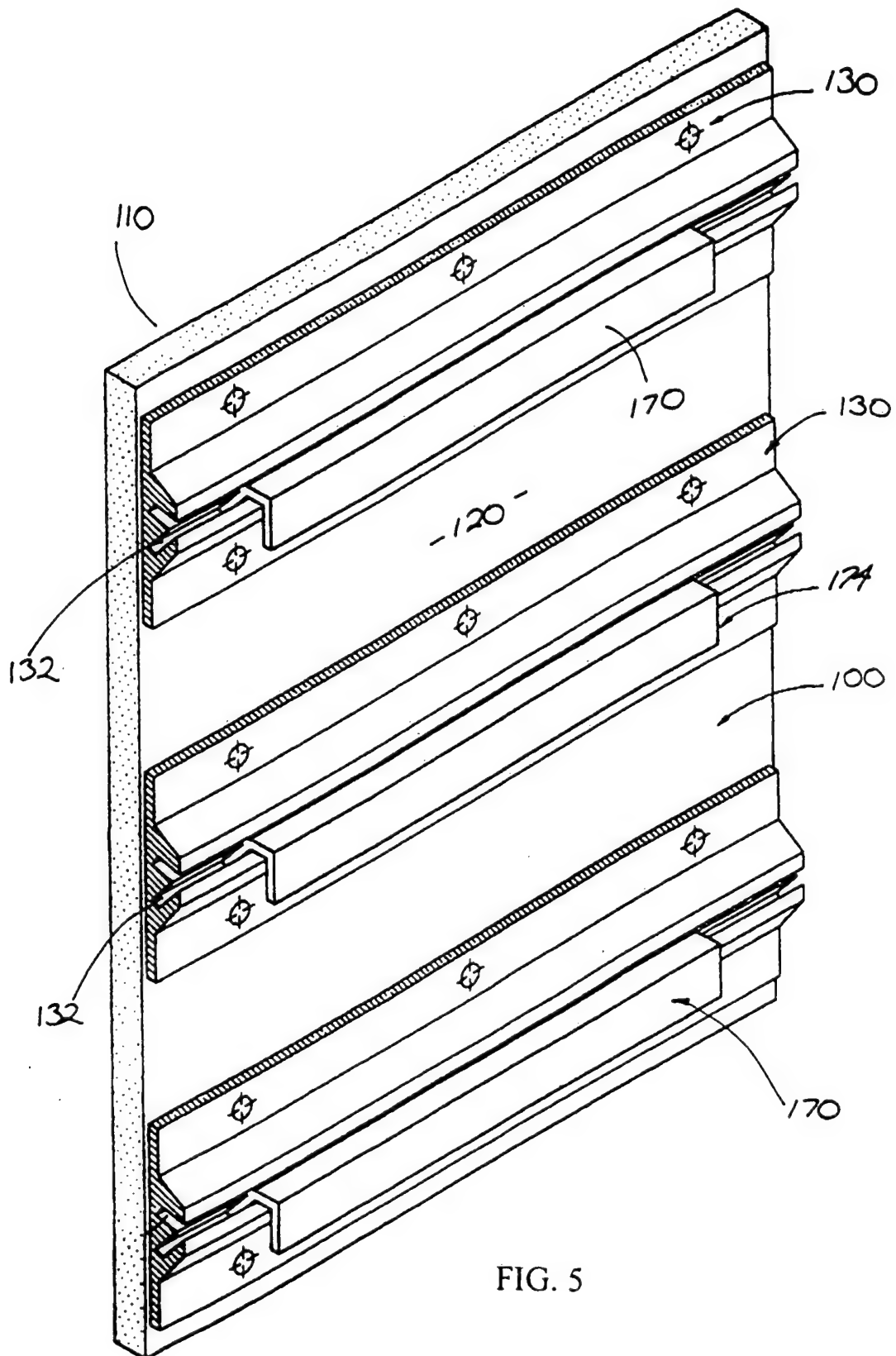


FIG. 5

6/8

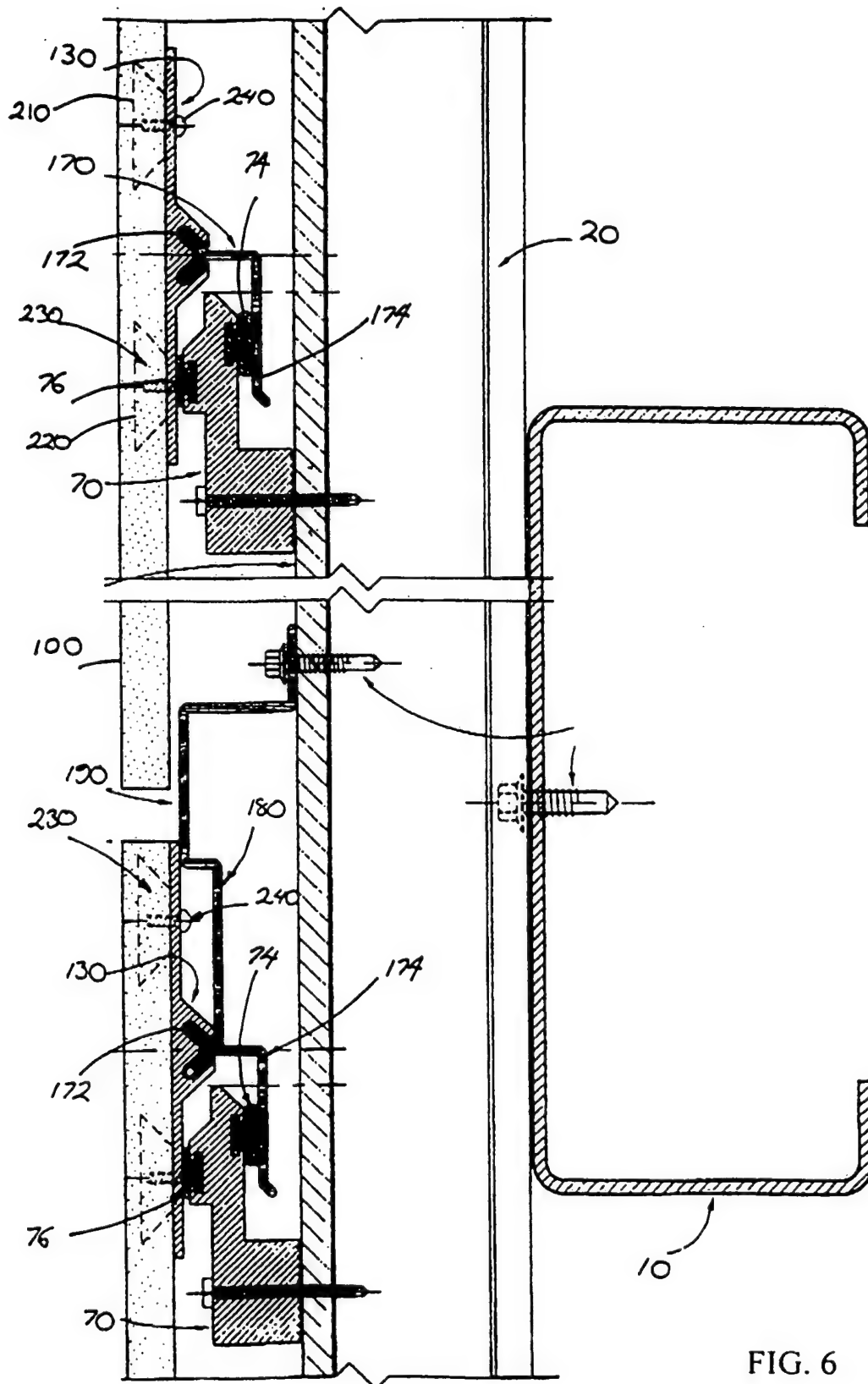


FIG. 6

7/8

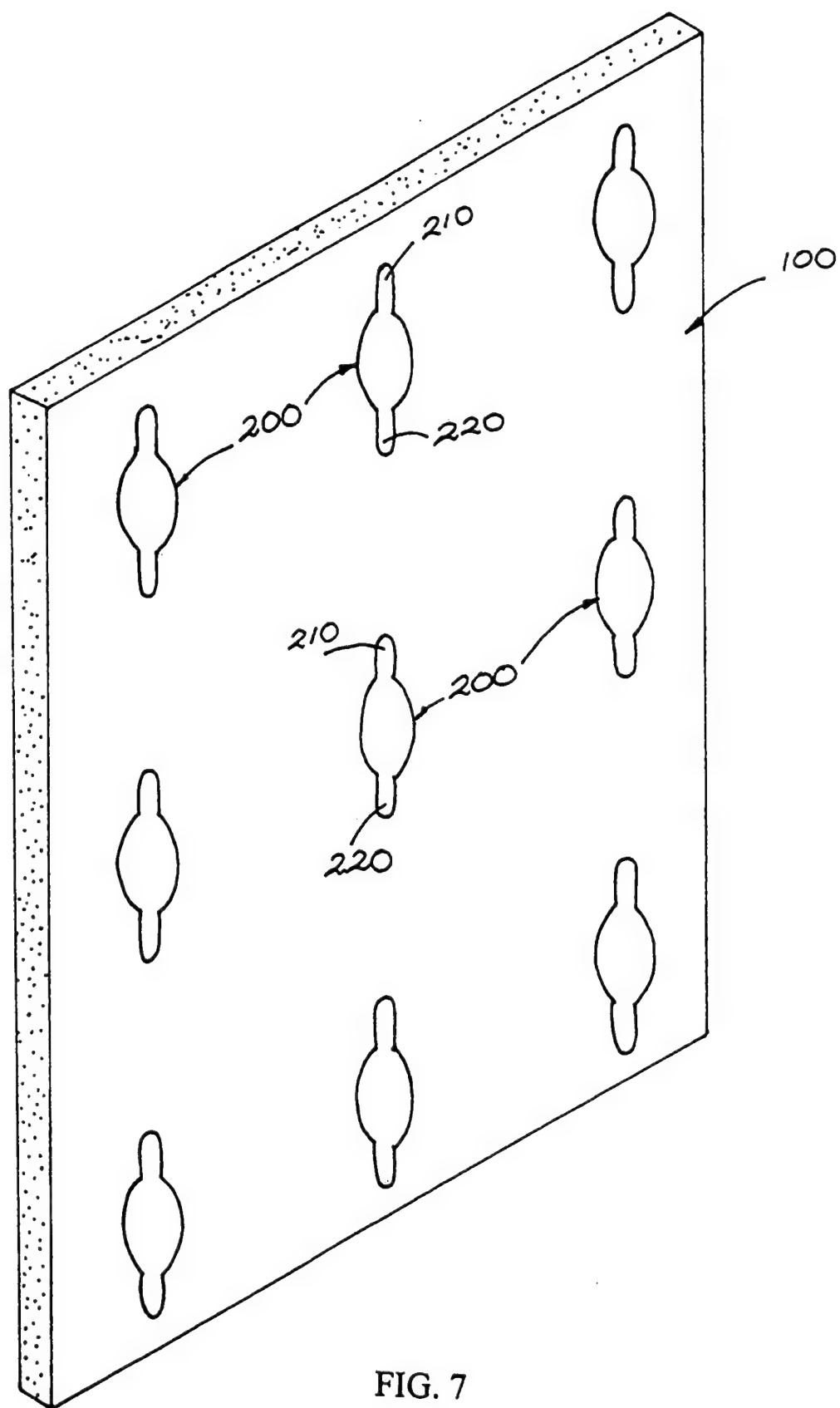


FIG. 7

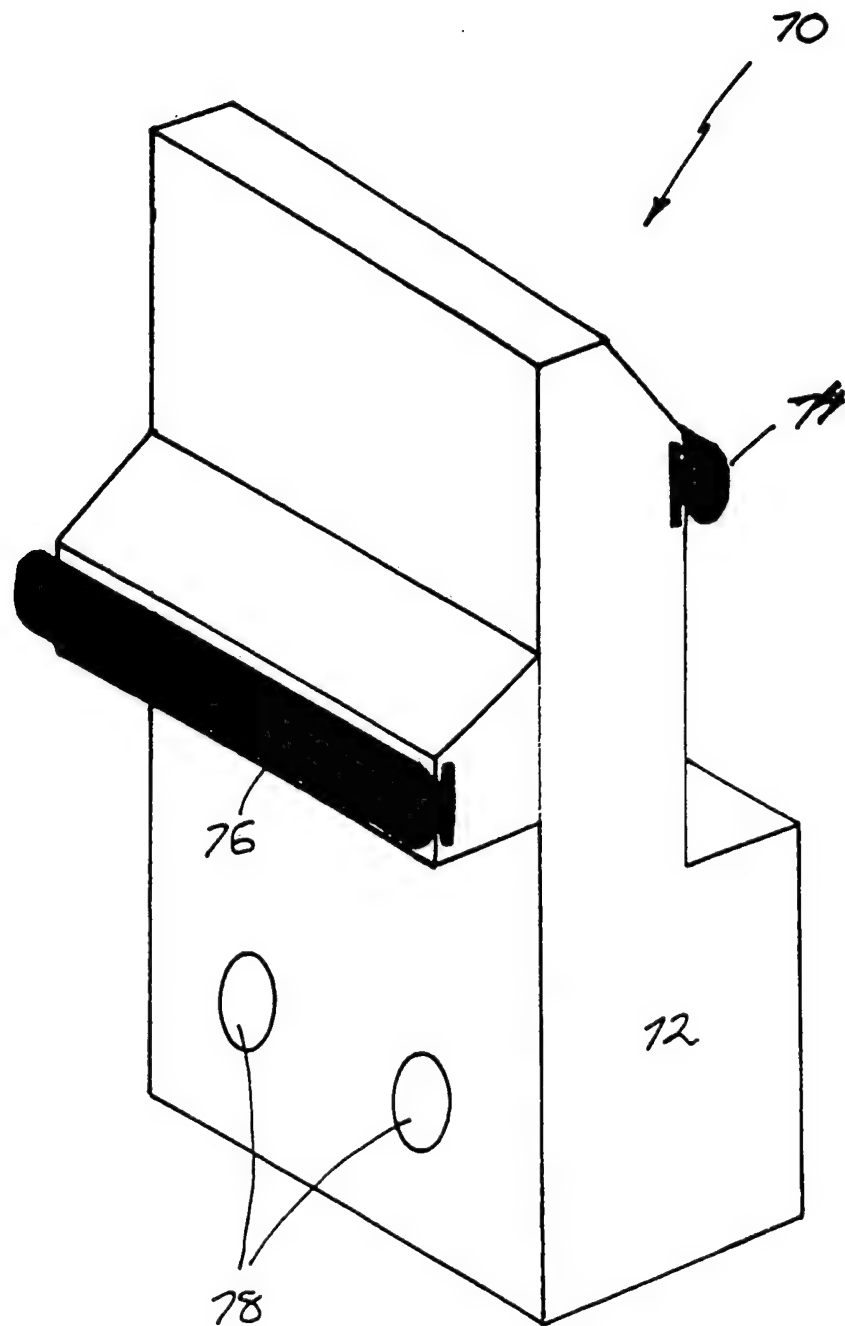


FIG. 8

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/AU 97/00582

A. CLASSIFICATION OF SUBJECT MATTER

Int Cl⁶: E04B 1/61.2/88, 2/96 E04F 13/08, 13/14, E04C 2/38

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC E04B 1/61.2/88, 2/96, 1/38, E04F 13/08, 13/14, E04C 2/38

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

AU: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DERWENT

JAPIO

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP A 625618 (STO VEROTEC GmbH) 23 November 1994 Column 3 line 14 - Column 5 line 21.	1-6.8-10.13-17, 20-21
X	WO A 91/14057 (GNS UK LIMITED) 19 September 1991 Entire document	1-6.8-10.13-17.20-21
X	US A 4553366 (GUERIN) 19 November 1985 Figures 5-10	1-6.8-10.13-17.20-21

☒ Further documents are listed in the continuation of Box C

☒ See patent family annex

<p>* Special categories of cited documents:</p>		
"A"	document defining the general state of the art which is not considered to be of particular relevance	"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E"	earlier document but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search
17 October 1997

Date of mailing of the international search report

03 NOV 1997

Name and mailing address of the ISA/AU
AUSTRALIAN INDUSTRIAL PROPERTY ORGANISATION
PO BOX 200
WODEN ACT 2606
AUSTRALIA Facsimile No.: (02) 6285 3929

Authorized officer

JOHN HO

Telephone No.: (02) 6283 2329

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/AU 97/00582

C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE A 3923800 (MONTAFLEX ALUMINIUM PROFILE + BAUARTIKEL GmbH) 24 January 1991 Column 1 line 66 - column 2 line 59.	1-6,8-10, 13-17,20-21
X	US A 4058944 (RIEGER) 22 November 1977 Column 2 lines 2-5 - Column 4 lines 1-3.	1-6,8-10,13- 15,16-17,20- 21.
X	WO A 90/08240 (KURMANN) 26 July 1990 Figures 1-10	1-8,13-15
X	AU B 46878/89 (616088) (NATIONAL GYPSUM COMPANY) 17 October 1991 Figures 2-6	1-4,6,8,13-15
X	Patent Abstract of Japan, M1042, page 53. JP 2-204566 A (TAKENAKA KOMUTEN CO LTD) 14 August 1990 Abstract	1-6,8,13-15
X	US A 5301484 (JANSSON) 12 April 1994 Column 2 line 34 - column 3 line 56	16-21
X	US A 4187658 (REINWALL JR.) 12 February 1980 Column 1 line 63 - column 2 line 49	16-17, 20-21
X	GB A 1577648 (SADACEM) 29 October 1980 Entire document	16-21
X	GB A 2067622 (ANNAWERK KERAMISCHE BETRIEBE GmbH) 30 July 1981 Page 2 lines 50-65	16-17,20-21
X	DE A 4209834 (BRICH D.) 30 September 1993 Figures 1-3	16-17, 20-21
X	DE A 3505335 (G & H MONTAGE GmbH) 21 August 1986 Figures 1,2,4	16-17,20-21

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/AU 97/00582

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

"see attachment"

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/AU 97/00582

Box II

The International application does not comply with the requirements of unity of invention because it does not relate to one invention nor to a group of inventions so linked as to form a single general inventive concept. In coming to this conclusion the International Searching Authority has found that there are two inventions:

1 Independent claim 1 is directed to a cladding board mounting system for mounting cladding boards adjacent to a surface to be concealed including at least one support member to be attached to an interior mounting member wherein a first segment is adapted for releasable engagement with a complimentary engaging formation on the support member, and a second segment adapted for releasable connection to the surface to be concealed. This attachment of a releasable connection to the support member is considered to comprise the "special technical feature" of this claim.

2.. Independent claim 16 is directed to a cladding board mounting system for mounting cladding boards adjacent to a surface to be concealed including a plurality of reinforcement members attached to the cladding board, plurality of resilient mounting means to mount the cladding board on the surface wherein the resilient mounting means allow limited movement of the cladding board relative to the surface to be concealed. The use of resilient mounting means to mount the cladding board is considered to comprise the "special technical feature" of claim 16.

Since the above mentioned groups do not share either of the technical features identified, a "technical relationship" between the inventions, as defined in PCT Rule 1302 does not exist. Accordingly, the international application does not relate to one invention or to a single inventive concept.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No.

PCT/AU 97/00582

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report				Patent Family Member			
EP	625618	CA	2123031				
WO	9114057	AU	74522/91	CA	2078112	EP	521891
		HK	174/96	US	5435111		
US	4553366	CA	1200706	EP	88658	FR	2522049
DE	3923800						
US	4058944	AT	5199/75	BE	843801	CH	606674
		DE	2629917	ES	449575	FR	2317435
		GB	1544487	IT	1067063	NL	7607441
		YU	1656/76				
WO	9008240	AU	48483/90	CA	2007868	EP	378726
AU	46878/89	CA	1309228	CN	1044509	EP	381356
		NZ	232209	US	4976083	US	4995215
		US	5058354	US	5058355	US	5107651
US	5301484	EP	550395	JP	6042146	SE	9103855
US	4187658						
GB	1577648	BE	839314	DE	2709869	FR	2343870
		US	4073107				
GB	2067622	BE	887046	DE	3001278	FR	2473597
		IT	1129375	NL	8006328		
DE	4209834						
DE	3505335						

END OF ANNEX